## REMARKS

Claims 1-30 have been examined and have been rejected under 35 U.S.C. § 103(a).

### I. Rejection under 35 U.S.C. § 103(a) over U.S. Patent No. 6,574,489 to Uriya ("Uriya"), JP Patent No. 59-010091 to Tsutsumi ("Tsutsumi"), and EP Appln. No. 0 866 592 to Brisebois et al. ("Brisebois")

Claims 1, 14, 15, 19, 27, and 28 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Uriya, Tsutsumi, and Brisebois.

#### A. Claim 1

As a preliminary matter, Applicant has incorporated the features of claim 27 into claim 1 and has cancelled claim 27 without prejudice or disclaimer. Applicant submits that claim 1 is patentable over the cited references.

For example, claim 1 states that a vibration control unit generates a driving signal from an audio signal and causes a vibration notification unit to vibrate according to the driving signal. Also, the claim states that the vibration control unit modifies the audio signal to produce a modified audio signal and outputs the modified audio signal as the drive signal.

Fig. 2 of the present application shows an illustrative, non-limiting embodiment of the vibration control unit. Specifically, the figure shows a vibration control unit 11 that comprises a low pass filter ("LPF") 11a, an amplifier 11b, a rectified envelop detector 11c, and a rectified level detector 11d. The LPF 11a inputs an audio signal and outputs the low frequency components of the audio signal, and the amplifier 11b amplifies the low frequency components to produce amplified low frequency components (Fig. 3A). Then, the envelope detector 11c inputs the amplified low frequency components and produces a corresponding rectified envelope signal (Fig. 3B), and the level detector 11d inputs the envelope signal and outputs a

corresponding DC pulse signal (Fig. 3C). The vibration control unit 11 outputs the DC pulse signal as the drive signal.

On page 4 of the Office Action, the Examiner maintains that Tsutsumi suggests the features above, but Applicant respectfully disagrees. Specifically, in Tsutsumi, the speakers 2 and 2 of the headphone (Fig. 1) receive an audio signal from a source 13 and generate sound based on the signal. Also, the vibrator 11 receives the audio signal via the cable 9 and vibrates in accordance with the same audio signal.

Therefore, the reference does not modify an audio signal and does not output a modified audio signal as a drive signal for driving a vibration notification unit. On page 5 of the Office Action, the Examiner seems to argue that Tsutsumi does, in fact, modify the audio signal because "the sound is modified in order [for the vibrator 11] to vibrate. Applicant respectfully disagrees with the Examiner's interpretation of the reference.

Specifically, in claim 1, the vibration control unit modifies the audio signal and outputs the modified audio signal as a drive signal for vibrating the vibration notification unit. On the other hand, in Tsutsumi, a source 13 (Fig. 3) supplies an electric audio signal via a plug 10 and a cable 9 directly to the vibrator 11. Therefore, the headphone (Fig. 1) uses the unmodified audio signal as a drive signal for causing the vibrator 11 to vibrate.

The Examiner may be relying on various statements in the English Abstract for Tsutsumi to support his position that the "sound is modified" to vibrate the vibrator 11. For example, the Abstract states that "the sound pressure accompanied with the same rhythm as the reproduced sound is transmitted from the vibrator 11." However, this statement merely states that the vibrator 11 vibrates with the same rhythm as the sound output from the speakers 2 and 2 and

does not imply that the sound is somehow modified to produce a driving signal for driving the vibrator 11.

In fact, since the vibrator 11 vibrates with the same rhythm as the rhythm of the sound output from the speakers 2 and 2, the above statement teaches that the electric audio signal that drives the speakers 2 and 2 is the same, unmodified, electric audio signal that drives the vibrator 11. Accordingly, the reference actually teaches away from modifying an audio signal to produce a drive signal for driving a vibration notification unit.

Since Uriya and Brisebois do not cures the deficient teachings of Tsutsumi with respect to claim 1, Applicant submits that the claim is patentable.

**B. Claim 14**

Since claim 14 depends upon claim 1, Applicant submits that the claim is patentable at least by virtue of its dependency.

**C. Claim 15**

Since claim 15 contains features that are similar to the features discussed above in conjunction with claim 1, Applicant submits that it is patentable for similar reasons.

**D. Claim 19**

Since claim 19 depends upon claim 15, Applicant submits that the claim is patentable at least by virtue of its dependency.

**E. Claim 27**

Since claim 27 has been canceled without prejudice or disclaimer, the rejection of the claim is moot.

**F. Claim 28**

Since claim 28 depends upon claim 1, Applicant submits that it is patentable at least by virtue of its dependency.

**II. Rejection of under 35 U.S.C. § 103(a) over Uriya and Tsutsumi**

Claims 29 and 30 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Uriya and Tsutsumi. Applicant submits that the claims are patentable over the cited references.

**A. Claim 29**

Claim 29 states that a control circuit modifies an audio signal to produce a modified audio signal, outputs the modified audio signal as a driving signal, and instructs a vibrator to vibrate according to the driving signal. Uriya and Tsutsumi do not suggest such features for reasons that are analogous to the reasons presented above in conjunction with claim 1. Accordingly, Applicant submits that claim 29 would not have been obvious over the references.

**B. Claim 30**

Since claim 30 depends upon claim 29, Applicant submits that it is patentable at least by virtue of its dependency.

**III. Rejection under 35 U.S.C. § 103(a) over Uriya, Tsutsumi, Brisebois and U.S. Patent No. 6,070,053 to Yamashita ("Yamashita")**

Claims 2, 10-13, 16, 17, 20, and 26 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Uriya, Tsutsumi, and Brisebois (as applied to claims 1 and 15 above) and further in view of Yamashita. Since such claims depend upon claim 1 or 15 and since Yamashita does not cure the deficient teachings of Uriya, Tsutsumi, and Brisebois with respect to claims 1 and 15, claims 2, 10-13, 16, 17, 20, and 26 are patentable at least by virtue of their dependency.

## IV. Rejection under 35 U.S.C. § 103(a) over Uriya, Tsutsumi, Brisebois, Yamashita, and U.S. Patent No. 6,259,935 to Saiki et al. ("Saiki")

Claims 3, 6-8, 18, and 25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Uriya, Tsutsumi, Brisebois, and Yamashita (as applied to claims 2 and 16) and further in view of Saiki. Applicant submits that the claims are patentable over the cited references.

### A. Claim 3

As a preliminary matter, Applicant has rewritten claim 3 in independent form. Clearly, this amendment does not change the scope of the claim.

Claim 3 comprises a vibration control unit that generates a driving signal (for causing a vibration notification unit to vibrate) based on low frequency components of the audio signal, which is music. On page 9 of the Office Action, the Examiner acknowledges that Uriya, Tsutsumi, Brisebois, and Yamashita do not suggest such features, but she contends that Fig. 4 and column 6, lines 24-27, of Saiki teaches the claimed control unit. Applicant respectfully disagrees.

As described in Saiki, a transducer 12 (Fig. 2) comprises a movable unit 2, a suspension 3, a diaphragm 4, and a voice coil 5. (Column 5, line 62, to column 6, line 9). The movable unit 2 and the suspension 3 constitute a first mechanical resonance system having a natural resonance frequency $f_{01}$. (Fig. 4; column 6, lines 12-15). The diaphragm 4 and the voice coil 5 constitute a second mechanical resonance system having a natural resonance frequency $f_{02}$. (Fig. 4; column 6, lines 15-19).

Accordingly, when an electrical signal having the frequency $f_{01}$ is supplied to the transducer 12, the movable unit 2 and the suspension 3 vibrate greatly, which in turn, causes the transducer 12 to vibrate. (Column 6, lines 24-29). On the other hand, when an electrical signal having the frequency $f_{02}$ is supplied to the transducer 12, the diaphragm 4 and the voice coil 5 move and generate a buzzer sound. (Column 6, lines 29-33). Also, when an electric signal having a bandwidth including the frequency $f_{02}$ is supplied to the transducer 12, the transducer acts as a typical loudspeaker, and the diaphragm 4 and the voice coil 5 move and may generate music or speech. (Column 6, lines 33-37).

Thus, Saiki arguably discloses that an electrical signal having the frequency $f_{01}$ will cause the movable unit 2 and suspension 3 to vibrate and act like a vibrator. However, the reference does not suggest that such an electric signal is an audio signal, which is music. In fact, Saiki suggests that music (or speech) signals have frequency bandwidths that include the frequency $f_{02}$ and thus, activating the diaphragm 4 and voice coil 5 to cause the transducer 12 to act like a loudspeaker, and not a vibrator. As a result, and contrary to the Examiner's assertion, column 6 of Saiki suggests that music (or speech) signals do not include the frequency $f_{01}$ and do not cause the transducer 12 to act like a vibrator.

Accordingly, Saiki does not suggest generating a drive signal, which drives a vibration notification unit, based on low frequency components of an audio signal. Therefore, Saiki (in combination with the other references) does not suggest generating such a drive signal based on low frequency components of an audio signal, which is music.

Also, Fig. 9 of Saiki shows an example in which a signal processing unit 36 outputs signals to the transducer 12 via a switch SW3. In particular, after the unit 36 outputs a signal C

to turn off the switch SW1, it outputs a signal J to turn on the switch SW3. (Column 13, lines 25-29 and 48-52). Subsequently, the signal processing unit 36 can output a music or sound signal to the transducer 12 via the amplifier 11, and the transducer 12 will act like a loudspeaker and reproduce the music or sound. (Column 13, lines 54-59). In this situation, the transducer 12 does not vibrate for the reasons discussed above.

Also, Saiki discloses that the unit 36 may output "a signal" to the transducer 12 to cause the transducer 12 to vibrate. (Column 13, lines 59-61). However, the reference does not disclose that this "signal" is a music or sound signal. In addition, since this "signal" must include the frequency $f_{01}$ to vibrate the transducer 12, the "signal" is some sort of notification signal and not a music or sound signal based on the discussion above.

In light of the arguments above, Applicant submits that claim 3 is patentable over the cited references.

**B. Claim 6**

Claim 6 and base claim 3 state that the vibration control unit comprises a low pass filter ("LPF") for passing the low frequency components of the audio signal, which is music. On page 9 of the Office Action, the Examiner contends that column 6, lines 24-37, suggest the claimed LPF, but Applicant respectfully disagrees because the cited portion of the reference does not mention an LPF.

Also, Figs. 7-10 of Saiki show LPFs 19, but these LPFs 19 do not pass low frequency components of an audio signal, which is music. As a preliminary matter, the device A shown in Fig. 1 contains a signal generator 10 that supplies a signal to the transducer 12. In contrast, the

device A3 shown in Fig. 7 does not contain a signal generator 10 and instead relies on "thermal noise" that is present in the circuit. (Column 11, lines 4-14).

Accordingly, in the device A3 in Fig. 7, when the signal processing unit 36 outputs a signal C to turn on the switch SW1, the amplifier 11 amplifies the "thermal noise" and supplies it to the transducer 12. The frequency detector 13 outputs a signal having a large voltage when the signal E1 input to the transducer 12 equals the resonance frequency $f_{01}$ or $f_{02}$, and the detector 13 outputs a signal having a small voltage when the signal E1 does not equal the frequency $f_{01}$ or $f_{02}$. (Fig. 5; column 8, lines 15-60). Accordingly, the frequency detector 13 outputs a large voltage signal having the frequency $f_{01}$ and outputs a large voltage signal having the frequency $f_{02}$.

When the signal processing unit 36 outputs a selection signal H to connect the switch SW2 to the X terminal, the LPF 19 outputs the signal having the frequency $f_{01}$, which is amplified via the amplifier 11 and fed back to the transducer 12. As a result, the transducer 12 only inputs a signal having the resonance frequency $f_{01}$ and vibrates at an intense vibration. (Column 11, line 65, to column 12, line 3). On the other hand, when the signal processing unit 36 outputs the selection signal H to connect the switch SW2 to the Y terminal, the high pass filter ("HPF") 20 outputs the signal having the frequency $f_{02}$, which is amplified via the amplifier 11 and fed back to the transducer 12. As a result, the transducer 12 only inputs a signal having the resonance frequency $f_{02}$ and generates a sound. (Column 12, lines 3-6).

As described above, the LFP 19 and the HPF 20 only input the signals from the frequency detector 13. Therefore, Fig. 7 of Saiki does not remotely suggest any type of filter that passes the low frequency components of an audio signal, which is music, as recited in claim 6.

In addition, the LPFs 19 shown in Figs. 8-10 do not teach the filter recited in claim 6 for similar reasons.

Accordingly, in light of the discussion above, Applicant submits that claim 6 would not have been obvious. Also, since claim 6 depends upon claim 3, it is further patentable over Uriya, Tsutsumi, Brisebois, Yamashita, and Saiki at least by virtue of its dependency.

**C. Claim 7**

Applicant submits that claim 7 is patentable for reasons that are analogous to why claim 6 is patentable.

**D. Claim 8**

Since claim 8 depends upon claim 7, Applicant submits that it is patentable at least by virtue of its dependency.

**E. Claim 18**

As a preliminary matter, Applicant has rewritten claim 18 in independent form. Clearly, this amendment does not change the scope of the claim. Also, since claim 18 contains features that are similar to the features recited in claim 3, Applicant submits that it is patentable for similar reasons.

**F. Claim 25**

Applicant submits that claim 25 is patentable for reasons that are analogous to why claim 6 is patentable. Also, since claim 25 depends upon claim 18, it is additionally patentable at least by virtue of its dependency.

**V. Rejection under 35 U.S.C. § 103(a) over Uriya, Tsutsumi, Brisebois, Yamashita, Saiki, and U.S. Patent No. 6,195,571 to Osuge ("Osuge")**

Claim 9 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Uriya, Tsutsumi, Brisebois, Yamashita, and Saiki (as applied to claim 8) and further in view of Osuge. Since claim 9 depends upon claim 8 and since Osuge does not cure the deficient teachings of Uriya, Tsutsumi, Brisebois, Yamashita, and Saiki with respect to claim 8, Applicant submits that claim 9 is patentable at least by virtue of its dependency.

**VI. Rejection under 35 U.S.C. § 103(a) over Uriya, Tsutsumi, Brisebois, Yamashita, and U.S. Patent No. 6,662,022 to Kanamori et al. ("Kanamori")**

Claims 4 and 5 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Uriya, Tsutsumi, Brisebois, and Yamashita (as applied to claim 2) and further in view of Kanamori. Since claims 4 and 5 depend upon claim 2 and since Kanamori does not cure the deficient teachings of Uriya, Tsutsumi, Brisebois, and Yamashita with respect to claim 2, Applicant submits that claims 4 and 5 are patentable at least by virtue of their dependency.

**VII. Rejection under 35 U.S.C. § 103(a) over Uriya, Tsutsumi, Brisebois, and Kanamori**

Claims 21-23 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Uriya, Tsutsumi, and Brisebois (as applied to claim 15) and further in view of Kanamori. Since claims 21-23 depend upon claim 15 and since Kanamori does not cure the deficient teachings of Uriya, Tsutsumi, and Brisebois with respect to claim 15, Applicant submits that claims 21-23 are patentable at least by virtue of their dependency.

**VIII. Rejection under 35 U.S.C. § 103(a) over Uriya, Tsutsumi, Brisebois, and Saiki**

Claim 24 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Uriya, Tsutsumi, and Brisebois (as applied to claim 15) and further in view of Saiki. As a preliminary

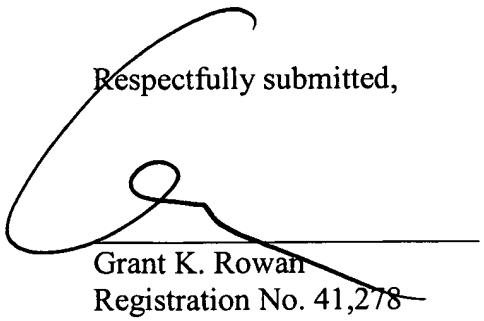
matter, Applicant has rewritten claim 24 in independent form. Clearly, this amendment does not change the scope of the claim. Since claim 24 contains features that are similar to the features discussed above in conjunction with claim 6, Applicant submits that the claim is patentable for similar reasons.

**IX. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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